Idaho National Laboratory: The Role of Nuclear in Reaching Net-Zero Emissions
DOE labs support the entire technology lifecycle
## Unique INL site, infrastructure, and facilities enable energy and security RD&D at scale

<table>
<thead>
<tr>
<th>Metric</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>FY22 Total Operating Cost</td>
<td>$1,630 M</td>
</tr>
<tr>
<td>Employees</td>
<td>5,700+</td>
</tr>
<tr>
<td>Acres</td>
<td>569,178</td>
</tr>
<tr>
<td>Square Miles</td>
<td>890</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Feature</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Radiological facilities/activities</td>
<td>49</td>
</tr>
<tr>
<td>Operating reactors</td>
<td>4</td>
</tr>
<tr>
<td>Hazard Category II &amp; III non-reactor facilities/ activities</td>
<td>22</td>
</tr>
<tr>
<td>Radiological facilities/activities</td>
<td>49</td>
</tr>
<tr>
<td>Miles railroad for shipping nuclear fuel</td>
<td>17.5</td>
</tr>
<tr>
<td>Miles primary roads (125 miles total)</td>
<td>44</td>
</tr>
<tr>
<td>Substations with interfaces to two power providers</td>
<td>9</td>
</tr>
<tr>
<td>Miles high-voltage transmission &amp; distribution lines</td>
<td>128</td>
</tr>
<tr>
<td>Fire Stations</td>
<td>3</td>
</tr>
</tbody>
</table>
INL's Roadmap to Net-Zero through Nuclear

Time to Market and Operability Case Study for On-Site Microreactor Deployment

Infrastructure & Siting
Developing infrastructure and siting resources necessary for onsite deployment

Licensing & Regulation
Determine efficient, timely and economical process

Fuel Cycle
Entire cycle from fuel identification to waste management

Financial & Contracting
Identify financial structure and funding methodology

Public Engagement: Communication, Outreach, and Education
NRIC/NRC Collaboration

- Congress recognized the importance of agency coordination in the Nuclear Energy Innovation Capabilities Act
- DOE/NRC MOU to “coordinate DOE and NRC technical readiness and sharing of technical expertise and knowledge on advanced nuclear reactor technologies and nuclear energy innovation, including reactor concepts demonstrations, through the [NRIC].”
  - NRIC Rotations
- Monthly Coordination Calls – DOE/NRC/NRIC

Fred Sock  
Office of Nuclear Regulatory Research

Allen Fetter  
Office of Nuclear Reactor Regulation
Accelerating advanced reactor demonstration & deployment
Collaborations

• National Labs
  – Partnering on key Net-Zero initiatives with all 17 national labs

• State of Idaho
  – EV infrastructure & workforce development

• Universities
  – Innovations, research, and workforce development

• Tribal Nations

• Net-Zero World
  – Ukraine
  – Indonesia
  – ASEAN
Transforming the world to a net-zero future

https://www.youtube.com/watch?v=DYD-Cz_T8cc
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(o) 208-526-5390

Visit our website at inl.gov/net-zero/
Backup slides
Research, Development, & Demonstration at Idaho National Laboratory

- INL’s site characteristics and operations make it a highly relevant demonstration site
- Representative of a city or county.
- INL will lead by example; lessons learned can inform best-practices

600+ Total vehicles
5,700+ Employees
300+ DOE-owned buildings & trailers
~50 MW purchased in FY20
U.S. nuclear industry recognizes the demand for new nuclear power projects

Utilities recently identify the need to add 100 gigawatts of nuclear power by 2050, more than doubling current capacity.

- Utilities are prepared to invest in nuclear energy because it is a proven non-carbon-emitting solution
- New reactor designs are simpler, more versatile, and more economical at scale
- Utilities are evaluating reusing retired coal plant sites to leverage existing infrastructure and workforce
- Emissions avoided by adding 100 gigawatts of nuclear power is equivalent to taking more than 100 million cars off the road.

Today, 92 reactors provide nearly 20% of the electricity produced for our power grid and more than half of our carbon-free electricity – more than solar, wind, hydro, and geothermal combined.
U.S. domestic nuclear capacity has the potential to scale from ~100 GW in 2023 to ~300 GW by 2050.
Next level integrated energy systems – Demonstrating the pathway to commercial use

Scaling up high temp electrolysis for hydrogen production

25 kW

250 kW

10+ MW